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steller's sea cow
survival in 1910,
conseiller scientifique
de Roald AMUNDSEN
HARALD U. SVERDRUP
TRE AAR I ISEN
MED «MAUD>>
(Three years comong
the ices aboard - Mand) Land)
MED ET TILLÆG OM EN
SLÆDEREISE RUNDT TSJUKTSJER
HALVØEN
[p. 205]
GYLDENDAL
NORSK FORLAGOSLO
MCMXXVI
1926

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Den lille tandhval, hvitfisken, findes ogsaa i mængder langs kysten, men paa nordkysten fanger tsjuktsjerne meget faa av dem, for de synker, naar de blir skutt, bare en hun med et stort foster flyter op. Narhvalen med sin lange, ret fremstaaende tand som minder om et horn later ikke til at findes nu; de tsjuktsjere, jeg har ■ spurt kjender den i det mindste ikke, men den maa ha forekommet her tidligere; for tanden, som har værdi som elfenben, findes av og til i strandvolden. Ved Kap Bering kunde en tsjuktsjer fortælle mig, at de for et par aar siden hadde set en temmelig stor tandhval, som efter beskrivelsen maa ha været en spermacethval (kaskelot). Men den eneste store hval, som findes her oppe i større antal er «Bowhead»en. I denne forbindelse kan det ogsaa nævnes at en russer fortalte os, at et eksemplar av havkoen (Rhytina), som skal være utdød omkring 1770 eller senest 1850, drev iland ved Indian Point for 8-10 aar siden.]

En hval repræsenterer et vældig matberg for tsjuktsjerne, men fra Uælen av og opover langs hele nordkysten er det saavidt mig bekjendt bare en mand ved Serdze-Kamen, som eier en hvalkanon. Paa nordkysten og paa sydkysten ogsaa for den saks skyld, blir det derfor ikke hval- men hvalrossfangsten, som gir de nødvendige forraad at falde tilbake paa om vinteren, naar sælfangsten slaar feil. Men de sidste 3 somre har der omtrent ikke været hvalross at faa dpaa; for langs landet har der hver sommer ligget et tæt belte sammenpakket is, og hvalrossen har holdt til utenfor det. Der skal være store masser av hvalross ute i Ishavet henimot Wrangell-øen, og engang imellem gaar et fangstfartøi ind, skyter masser, tar tænderne, huderne og spækket og lar kjøttet gaa tilsjøs. De driver rovfangst; men denne har ikke tat slikt omfang, at der endda er nogen fare for at hvalrossen skal utryddes slik som den er blit omkring Spitsbergen. For tsjuktsjerne vilde det bety en stor ulykke om hvalrossen forsvandt; selv sier de, de maatte utdø og de har kanske ret. Hvalrossen er ofte let at skyte. Langs kysten findes en række

steder hvor den pleier søke ind og lægge sig paa land for at sove i solen, og hvor man kan gaa like ind paa den og stikke den. Ligger den paa et isflak og soler sig er den ogsaa oftest let at komme ind paa, men da maa man skyte den død med første skud; for faar den adgang til at velte sig ut i vandet synker den. Det at den synker gjør det vanskelig at jage den i vandet, men tsjuktsjerne overvinder van-
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H.U. SVERDRUP: Tre aar i isen med 'Maud' (Oslo, Gyldendal, Norsk Forlag, 1926) (p. 205)
(3 ans parmi les glaces à bord du Maud)
"Près du cap Béring un Tchouktche m'a raconte qu'il y a quelques années il avait vu un jour un assez gros cetace denticète qui, à en juger par sa description, ne pouvait être qu'un cachalot (Kaskelot). En fait la seule sorte de gros cétacé qu'on rencontre là-bas en grandes quantités est la baleine Bowhead [baleine du Groenland, Balaena mysticetus]. A ce propos, il faudrait rappeler aussi qu'un Russe nous a parlé d'un spécimen de vache de mer <Rhytina), présumée éteinte dès les environs de 1770, et au plus tard, dans les années 1850, qui avait été entraîné par le courant 8 ou 10 ans auparavant, vers Indian Point le cap Tchapline].'
Near Bering cape,
had seen a
a Chukchee told us that same years ago
he
big enough denticate cetacean, which, from its description,
could only be a sperm whale (Kaskelot). In fact, the only kind of big cetacean met there in large great numbers is the bowhead whale [Balaena mysticeters]. Related to that, it should be remembered that a Russian spoke to us of a specimen of a sea cow · (Rhytinae), suppond to 1770, and at the latest in the 18504
the strean 8 or 10 years ago, toward Indian Point [= chaplin
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MYSTERY SIRENIAN OF
ST. HELENA.
LYDEKKER, R. (1899).
On the supposed former existence of a sirenian in St. Helena.
Proc. Zool. Soc. Lond. Year
1899 (June 20): 796-798.
1899.]
7. On the supposed former Existence of a Sirenian 1.
St. Helena. By R. LYDEKKER.
[Received June 12, 1899.]

In no zoological nor distributional work' with which I am acquainted can I find any reference to the alleged occurrence of a Manati in St. Helena. Nevertheless, there are records to the effect that an animal going by that name formerly inhabited that island. For example, Mr. J. C. Melliss, in his work on St. Helena[3], definitely states that a Manati once occurred there, and goes so far as to express his opinion that it was specifically identical either with Trichechus americanus or T. senegalensis. I am also informed by my friend Mr. R. A. Sterndale, now Governor of the island, that Manatis were formerly of such frequent occurrence that there was a regular government duty on each one killed.

Both Mr. Wallace in Island Life' and Messrs. Sclater in the 'Geography of Mammals' are silent on this subject.

2 St. Helena a Physical, Historical, and Topographical Description of the Island. London, 1875, pp. 86 & 87.

In answer to my enquiries, Mr. Sterndale wrote to me as follows on the subject: "The last appearance recorded of the Manati in St. Helena was in 1810, when one came ashore at Stone Top Valley beach, and was shot by a Mr. Burnham. It measured seven feet, and ten gallons of oil were obtained from it. Another was seen the same year in Manati Bay.

"In the old records I find, March 20, 1690, it thus entered- Tuesday. Goodwin and Coales brought up for killing a Sea-Cow, and not paying the Company's Royalty. They desire pardon, and say the Sen-Cow was very small; the oyle would not amount to above four or five gallons.'

"Again, on the 11th September, 1739, A Sea-Cow killed upon Old Woman's Valley beach, as it was lying asleep, by Warrall and Greentree."

""

This evidence, I take it, may be regarded as amply sufficient to prove the former occurrences of a marine mammal at St. Helena. And from the name "Manati Bay" given to a spot on the S.W. coast, it further seems evident that the animal in question was far from uncommon; although, on the other hand, it never seems to have been abundant. In addition to this, the name of the bay, and the application of the title Manati or Sea-Cow to the animal itself, seem to be evidence in favour of the Sirenian nature of the latter; for, so far as I am aware, such names are not misapplied in popular language to Seals. And there are no Seals known from the island. Moreover, if the creatures in question had been Seals they would almost certainly have been numerous, while they would not have been exterminated so easily. Against the Sirenian nature of the animal may, however, be urged the mention of the killing of a specimen asleep on the beach, since it is generally stated that there is no decisive evidence that Sirenians ever voluntarily come ashore. Too much importance must not, however, be attached to this, seeing that it is, in the first place, mainly negative evidence, while, in the second place, it might not be applicable in

the case of an extinct species, with which we may have to do in this instance. It decisively shows that the animal was not a Cetacean. With regard to the idea of the St. Helena animal being identical with either the African or the American Manati, it appears to me that this is impossible. In the first place, although it is conceiv able that an individual might once and again be carried from either shore to the island, it is quite out of the question that this could have been a case of common occurrence. And, accordingly, if the creature were a Sirenian at all, it must have been a denizen of the coast of the island. But such a coast, without a single river-mouth or estuary, would have been quite unsuited to the habits of Manatis, na we now know them. A Dugong might perhaps live there; but then there is no evidenco of the existence of those animals in the Atlantic.

If, then, the St. Helena animal were a Sirenian at all (on which

1 Tho samo extracts in n rather briefer form aro givon by Melling. Bee Flower and Lydekker: 'Study of Mammals,' p. 214.

point I do not wish at present to express a definite opinion), the probability is that it was at least an extinct species, if not a genus Could the existence of a St. Helena Sirenian be definitely determined, it would be of much interest in regard to the history and distribution of the group. Mr. Sterndale, who is convinced that the creature was a "Manati," has promised to make a thorough search in the island for any remains that may have escaped de struction; but I fear that any successful results are in the highest degree improbable. The best chance would be to thoroughi examine the shore at Manati Bay, especially if there are any raised beaches.

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DOES THE STELLER'S SEA COW STILL SURVIVE?

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In 1741, when Danish explorer Vitus Bering tried to determine if Siberia and Alaska were connected, he discovered the famous strait which now bears his name. The too-short story of the Rhytine, or North Pacific sea cow (Hydrodamalis gigas), thus began in 1741 when the German naturalist of the Bering expedition, Georg Wilhelm Steller, observed large herds of huge marine animals in the area of two islands discovered by the expedition. Those islands are now called Copper Island and Bering Island and form what the Russians call Komandorskie Ostrova (The Commander Islands).

The strange, dark-colored animals were 23 to 30 feet long, weighed several tons, and had oil of very high quality. Since they spent most of their

time eating sea weed, Stellar called them sea COWS. He thought they were closely related to the sea mammals known as sirenians, i.e., dugongs and manatees, and this was confirmed by subsequent study of preserved skeletons (Steller in Jordan, 1889).

The animal was hunted because of the peculiar tastes of its flesh and oil and in 1768, only 27 years later, the species was exterminated. But was it really? Several crytozoologists have speculated on its possible survival (Heuvelmans in 1965 and 1968, Halley in 1978, Mackal in 1980, and Sylvestre in 1983). Following is all of the available data, albeit summarized.

In 1879, Swedish Baron Erik A. Nordenskiold spent five days on Bering Island, where he tried to get information about the date of the extermination of the sea cow. In his Voyage of the Vega (1882) he writes:

"A creole, offspring of a Russian and an Aleutian, who was sixty-seven years of age, of

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February, 1987
11(3)

intelligent appearance, and in the full possession of his mental faculties, stated that his father died in 1847 at the age of 88. He had come from Volhynia, his native place, to Behring Island at the age of 18, accordingly in 1777. The two or three first years of his stay there, i.e., until 1779 or 1780, sea cows were still being killed as they pastured on sea-weed. The heart only was eaten, and the hide used for baydars (native boats). In consequence of its thickness the hide was split in two, and the two pieces thus obtained had gone to make a baydar twenty feet long, seven and a half feet broad, and three feet deep. After that time no sea cows had been killed.

"There is evidence, however, that a sea cow had been seen at the island still later. Two creoles, Feodor Mertchenin and Stepnoff, stated that about twenty five years ago (in 1854) at Tolstoj-mys, on the east side of the island, they had seen an animal unknown to them which was very thick before, but grew smaller behind, had small fore feet, and appeared with a length of about fifteen feet above the water, now raising

itself up, now lowering itself. The animal 'blew,' not through blow-holes, but through the mouth, which was somewhat drawn out. It was brown in colour with some lighter spots. A back fin was wanting, but when the animal raised itself it was horrible, on account of its great leanness, to see its backbone projecting."

Nordenskiold concluded that the date of the extermination of the sea cow should be given as 1854 at the very least. Unfortunately, the American Leonhard Stejneger, Steller's biographer, who spent one year on Bering Island, has given a different aspect of the events, having interviewed the natives quoted by the Danish explorer in order to check his sources (Stejneger, 1884).

Concerning the first informant, Pitr Vasilijef Burdukovskij, whose father saw a sea cow. Stejneger shows that Nordenskiold's report is

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wrong on several points: the kidneys were eaten, not the heart. The hide was "thinned down but not split, and for a twelve-man bajdara two hides were required." The creole was then (1882) 64 vears old. Nordenskiold thus misunderstood his age when he stated he was (in 1879) 67 years old. The date of the event, therefore, is 1774, soon after the supposed date of the extinction (1768). Stejneger supposes that Burdukovskij might be wrong on the date.

The second account reported by the Danish explorer must be rejected as irrelevant. Following is an excerpt of the most important points from Stejneger's questionnaire to Nicanor Pauloff Stepnoff:

"Question 11. Did you say, when you described how it dived, that it blew out a 'fountain' (fontanka)?

"Answer. Yes! When lifting the head up it spouted out water about as high as that (showing with his hand about four feet above the ground).

"Question 12. Whence did the jet rise, i.e., from what part of the head?

"Answer. From the top of the head, behind and above the eyes.

"(...) Question 15. What was its color?

"Answer. It was whitish (...), densely sprinkled with round blackish spots, which were about 6 inches long."

Fedor Ivanoff, the second informant, gave similar

details:
"Answer 11. When coming to the surface it blew like a whale, spouting out water about 2 to 3 feet high, like a small 'plavun' (Ziphius)."
"Answer 15. (It is very remarkable that in describing the color he used the very same words as Stepnoff, and that on the color scale he pointed out the same shade of color. The only difference was that he gave the color of the spots as dark brown; their form was rounded or somewhat oblong.)"
There are differences, even contradictions, between the stories, but it is important to remember that Nordenskiold spent five days on the island, instead of a whole year for Stejneger,

whose precise report may be considered the more reliable. I agree with Stejneger's explanation for the 1854 observation: that it was certainly a female narwhal (Monodon monoceros). (The males of the species are well known by their oversized "tusk": the size, the colour (including the dark spots), the absence of dorsal fin, the blowing manner, etc., are all consistent with this hypothesis.
In 1884, Frederick W. True, in a long article on the sea cow, related an account not located on Bering Island (True, 1884):
"Mr. Lucien Turner kindly informed me that an aged Aleut woman stated that Rhytina had been seen at Attu by her father, but such testimony is, perhaps, not altogether satisfactory."
It is, however, most remarkable that this sighting occurred, not off the Commander Islands, but on the westernmost Aleutian island, where a rib of sea cow has been recorded by Brandt. As will be seen later, there is fossil evidence that sea cows once ranged a much larger area (Jones, 1967; Gard, Lewis and Whitmore, 1972).
In 1879-85, Polish naturalist Benediktus Dybowski was on Bering's Island and, in contradiction of Stejneger, was certain that sea cows had been seen there as late as 1830 (Dybowski, 1885).
Either Nordenskiold or Stejneger or Dybowski were persuaded that the species was then (1885) extinct in the areas of Copper and Bering Islands, but was it extinct elsewhere?
Let us remember the observation at Attu reported by Mr. Turner. Steller, returning to Kamtchatka, also heard that the same animals were known to the natives as Kapustnik, or "cabbage eater," which describes the sea cow

very well. And, farther north, the Choukchi used the sea cow's skins for their boats.
F. A. Kulkov, a merchant, wrote in 1762 of the Blijinie Islands (Attu and Angattu): "whales are found rarely, and more rarely sea cows...." thus giving some background to Turner's report (Grekov, 1958). Describing Attak (Attu), Stemiya and Semichi Islands (in the Aleutians), the famous German naturalist Peter Simon Pallas wrote that many seals, white bears and manatis (one of the old names for the Steller's sea cow) could be found there. And in 1818, Frenchman Aldebert de Chamisso, naturalist of the Rurik expedition, heard from natives at Unalaska

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"vague stories which seemed to be related to the Manatus borealis," an old scientific name of the sea cow (Chamisso in Kotzebue, 1821).
When Russian navigator Ivan Krusenstern came back from a voyage around the world in 1806, Wilhelm Georg Tilesius, naturalist of the expedition, reported that travellers coming back from California spoke of seeing sea cows there (Grekov, 1958). Possibly related is the strange event that occurred in 1937, when Mrs. Charles Timeus sighted a mammal from a boat at Sunset Beach (British Columbia):
"It had a large head which resembled a long nosed pig only wider at snout, two large flippers and huge body... We searched the dictionary and the only thing we could find that resembled it was a Manatee."
Huevelmans (1968) thought it could be a sea elephant, which may also suit Tiselius's report, but a recent survival of the sea cow as far south as the California coast is equally unlikely [!] since in 1960 a Hydrodamalis skull fragment about 20,000 years old (by radiocarbon dating) was found at Monterey, California (Jones, 1967).
G. Sverdrup, oceanographer of the Maud expedition, collected a recent account which was published in 1930:
"A Russian told us that a specimen of sea cow was brought 8 or 10 years earlier (the story. being recorded in 1921, it was therefore 1911-1913) by the current towards the cape of Chaplin," not far from the Bering Strait (Grekov, 1958). How could the Russian know it was a sea cow, as it was supposedly extinct for 150 years.

Heptner (1965) judged the account unreliable.

The next sighting seems to have been forgotton by a majority of the authors, even the cryptozoologically open-minded, though it seems to be related to "our" sea cow. It was published in the Soviet scientific magazine Priroda (Nature) in 1962 by Dr. S. K. Klumov of the Moscow Oceanographic Institute (Klumov, 1962). In 1951-56, as he was working in the whaling stations of the N.W. Pacific, a harpooner named Ivan Skripkin told him:

"Then, you are a scientist, O.K.? Can you explain to me, please, what is this "beast," which we observe almost each year since several years, not far from Commander Islands? This animal appears almost always in the same place, and we observe it at the same time: generally in the first part of July. The place is not far from Bering Island, about 50 km in the Southeast...Of course, it is not a whale. We know the whales, by their appearance, by their fins, and by their blowing. This animal does not make any water jet, and it does not show its head out of the water, only the upper part of its back.

"The back is wide, large, smooth, without any fin, and black...Nobody could find any sensible explanation. Maybe a big fish? It was about 10 meters long..."

We can rule out all the cetaceans: few have no dorsal fin, fewer still are black and 10 meters long. In fact, only the sperm whale could fit the description. But a whale harpooner should have recognized it at first glance (remember that this anima made no water jet). An unknown fish would be more unlikely than the actual sighting of a sea cow.

In 1963 the Rhytina surfaced again in Priroda in

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an article by three Soviet scientists (Berzin, Tikhomiro and Troinin). In July 1962, the crew of the whaler ship Buran observed (about 300 feet away) a group of six strange animals, this time in the Cape Navarin area, near the coast of Kamtchatka, in shallow waters covered with sea cabbage:

"The skin was dark, the head relatively small, with an abrupt transition towards the body, the upper lip separated in two parts and overflowing

on the lower lip...; the tail of the animal puzzled the observers by the sharp fringe it possessed. The animals were swimming slowly, diving periodically for a very short time, then coming out of the water in a pronounced manner. group formed a dense herd of animals, probably of different ages, 6 to 8 meters long, swimming in the same direction.' 11
The
As the three scientists described it, the animals could not have been seals or walruses, which are less than four meters long, nor whales, because of their peculiar lip and the transition from the head to the body (at least present cetaceans can be ruled out: fossil archeocets had a well-marked neck). On the other hand, their resemblance to the sea cow is striking, and the biotope is typical of these animals. Similar reports had been recorded by TINRO (Institute of Scientific Research in Pisciculture and Oceanography of the Pacific); they came from fisherman and inhabitants not only from eastern Kamtchatka, but also from Northern Kurils and from Tchoukotka.
The article by Berzin. Tikhomiro and Troinin was severely attacked two years later, again in Priroda, by Soviet mammalogist V. H. Heptner. First he states that the sea cows were living only in the surroundings of the Commander Islands, despite the above evidence. Then he claims that it is impossible that an animal could remain undiscovered 200 years.
The latter statement is wrong on two counts. First, there were observations of sea cows between 1768 and 1962; second, there is the case of the coelacanth, a fish unknown to science until 1938, which belongs to a group (crossopterygians) thought to be extinct for 65 million years. It was, however, well known to the Comoros fishermen who ate them and used their spiny scales to repair their bicycle tires!
"The beasts which Berzin and others describe are not at all similar to Steller's cow. The sea cow did not have its upper lip divided (that is clear after Steller's description and the drawing surely made by Steller himself)."
Wrong again, since Steller is not the author of the drawings, and he writes in his De Bestiis Marinis (About Marine Beasts) that "the lips, both the upper and the lower, are double and divided into external and internal lips." Heptner states that there was no distinct separation

between the head and the body, although Steller writes: "what obscurely suggests a neck is shorter by one-half than the head itself, and is cylindrical and more slender than the occiput in circumference.'
." There is, it seems, a distinct restriction behind the head. Finally, what did the crew of the Buran see, according to Heptner? Again, female narwals! In the case of Nordenskiold's informants, Stejneger's explanation seems valid, but here the hypothesis cannot be supported: among recent cetaceans, the neck is much less distinct than in sirenians. In addition, a herd of six females would be unlikely.
A new account on the survival of the sea cow was published in a Soviet newspaper (Malukovich, 1977). The author, from the Kamchatka Museum of local lore, was told by Ivan Nikiforovich Chechulin that he and several workers in a salmon industry had seen a stranded cadaver in the summer of 1976 at Anapkinskaya Bay and were surprised by its very long snout: "its skin was dark, its tail was forked like that of a whale, the extremities of the animal were flippers..." When Malukovich showed him a drawing of the Steller's sea cow, Chechulin said it was indeed this animal. The author adds that in the bones collected for the museum, there were some of marine animals:
"Later on, the scientists published the results of their investigations in Kamchatskaya Pravda, where they noted that one of the bones appeared to be that of a sea cow that died about 10 years ago.
This brief account suggests that the survival of the sea cow is not at all unlikely. It is interesting to note that the places where sea cows have been reported since the date of its "official" extinction closely match the areas where fossil remains have been found following these reports.
The directions for future research include

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bibliographic research to get precise details on the areas where sea cows can be seen, and expeditions in the Aleutian Islands, (the recent incident involving KAL 007 indicates that the Kamchatka area is too dangerous for western

field cryptozoologists). Derek Hutchinson, an English explorer, has nevertheless been searching for surviving sea cows in this area (Welfare and Fairley, 1980).

The autumn 1985 issue of ISC Newsletter quoted a 1984 Izvestia report that a Soviet physicist, Anatoly Shkunkov, was said to be searching for sea cows off Kamchatka, "where a biologist previously reported observing a marine mammal resembling the extinct sirenian."

To be continued...?

Many thanks to Bernard Heuvelmans and Rene Laurenceau for translations from Russian. The author is very interested in locating additional references, particularly Richard Harlan's Fauna americana (Philadelphia, 1825) and Lucien Turner's Contribution to the Natural History of Alaska, both on the sea cow in Alaska, and

STEINEGER Georg Withelm Stoller

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Continued under SEA COW on page 37.

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The INFO Journal welcomes exchanges with other Fortean publications. The above listing is provided free, and all we ask is a similar mention in your own publication. Readers, please mention the INFO Journal if you write to any of the above. They all deserve your support.
NESS, continued from page 23.
44. May 15, 1981 Fort Augustus: A motorist spots a puma (Francis, p. 146).
45. August 30, 1981 - Dores: A police officer observes a big cat (Francis, p. 26).
46.
47.
August, 1981 Bottom of Loch Ness: Video equipment operator from on board the "New Atlantis reveals an unidentified species of small white animal on the Loch bottom (Nessletters 47 and 48).
July, 1984 Loch Oich: Roland Watson discovers a possible big cat print in the sand, but is unsure if it might not have been caused by a stone (Nessletter 67).
Round about the accredited and orderly facts of every science there ever floats a sort of dust cloud of exceptional observations, of occurences minute and irregular and seldom met with, which it always proves more easy to ignore than to attend to. .Anyone will renovate his science who will steadily look after the irregular phenomena. And when the science is renewed, its new formulas often have more of the voice of the exceptions in them than of what were supposed to be the rules.
William James

HIDDEN ROOM SOUGHT IN PYRAMID
The idea of finding a hidden room in the Great Pyramid has attracted treasure seekers and

scientists for years. Regardless of the methods used, none has been found to date, but a team of French and Egyptian archeologists have recently been drilling through the wall of a gallery leading to the Queen's Chamber and think they may be on to something. Three holes were drilled through the limestone blocks to a depth of eight feet when they met a lining of fine soft limestone sand. At this point drilling was stopped and will probably resume when they can get some better drills.
Based
The discovery of the sand may indicate the lining of a cavity, perhaps a secret room.
on architectural studies of anomalies in the interior stonework, the team anticipates finding at least three cavities. When the cavities are located, they plan to photograph the interior by inserting remote cameras. The possibility of finding rooms in the pyramid that have not been plundered has created a 'flurry of excitement' among Egyptologists.
Los Angeles Times, Sep. 9, 1986, and Pittsburgh Post Gazette, Sep. 4, 1986. Cr: 0. Oltcher.

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North American Fauna
SCHEFFER (Victor B.):
(United States Dept of the interior, fish and wildlife service, "2 61, Washington, 1959
DO NORTH AMERICAN FAUNA 61, FISH AND WILDLIFE SERVICE
when the reindeer moved to more-distant parts of the island, the natives lost interest.
The Government teacher would sometimes organize an expedition to procure reindeer meat, but, on the whole, the Aleuts preferred fishing.
According to the Government teacher stationed on Atka Island in 1937, some of the reindeer appeared to be diseased and, very poor. Some had "pus in the joints" and some had lesions above the hoofs.
It must be concluded that reindeer have proven to be a failure in the Aleutian district and that, while they are able to subsist to some extent, the forage in this area is not suitable for intensive reindeer raising.
Family BOVIDAE
Ovis dalli: Dall Sheep (White Sheep)
Ovis dalli dalli
Russian: Dee-ke bar-an "Wild Sheep" (Buxton)
Osgood (1904, p. 30) says-
White sheep are found in small numbers in the mountains between Lake Clark and Cook Inlet, and are probably more or less continuously distributed

from there northward along the 'Alaska Range. They are not reported from the mountains near Iliamna Bay, so it is probable that they do not occur farther west than the vicinity of Lake Clark.

There are two specimens in the National Museum obtained by McKay from the Chigmit Mountains (which proves to be an indefinite locality designation, meaning somewhere in the mountains back from Nushagak)..

Family HYDRODAMALIDAE

Hydrodamalis gigas: Steller Sea Cow

Russian: Morskaia korova (Steller)

Our knowledge of the sea cow depends mainly on the account of Steller, who, in the disastrous winter when Bering's expedition was wrecked on Bering Island after discovery of Alaska in 1741, had ample opportunity to study this animal at first hand. The sea cow furnished food for Bering's party, as well as for other expeditions that used the Commander Islands as a starting point for Alaska. It was exterminated by 1768.

There has always been a question whether this animal had

ever occupied the Aleutian Islands. Stejneger (1883, p. 84) said Wosnessenski had obtained a rib of a sea cow from Attu Island, and, in conversation, Stejneger expressed the belief that sea cow remains might be found on Agattu Island.

Goode et al. (1884, p. 136), wrote as follows concerning this find:

Wosnessenski found a rib of the animal on Attu, the last island of the archipelago, but as Brandt suggests, it may have been derived from a Rhytina washed thither by the waves. Mr. Lucien Turner kindly informed me that an aged Aleut woman stated that Rhytina had been seen at Attu by her father, but such testimony is, perhaps, not altogether satisfactory. Thus, we have some evidence that the sea cow may have occated on the westernmost Aleutian Islands, and it would be extremely interesting to have identification of bones from old Atau village sites. To date, studies of such midden material have art revealed the presence of sea cow remains, and, on the whole, it is likely that this animal never inhabited these islands except ac en accidental straggler.

Family BALAENIDAE

Eubalaena sieboldii: Pacific Right Whale

At (Umnak?): Kulámax (Jochelson)

This whale ranged in the Aleutian waters in former times, but since whales of all kinds have been destroyed so extensively, some, species have become exceedingly rare, and the right whale is seldom, if ever, seen any more. Osgood (1904, p. 27) mentions a stranded whale between Kanatak and Wide Bay in 1902, which he tentatively assumed to be the right whale. True (1904, p. 270) quotes Pechuel to the effect that a right whale was killed near the Aleutians. Birkeland (1926, p. 26) stated that he knows of only two right whales that were killed at the Akutan whaling station, dating from about 1914 (he has a photograph of one of the two whales mentioned). We saw none of this species on our expeditions to the Aleutians.

Balaena mysticetus: Bowhead Whale
Aleut (Umnak?): Ugamáxcax' (Jochelson)
Essentially, this is an Arctic whale that came into Bering Sea and visited the Kuril and Aleutian Islands, but it has become rare in the Aleutians. We obtained no certain records of it during our visits.

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their tails are greatly flattened horizontally. Ordinary otters are adapted to the catching of fish beneath the surface of fresh-waters, and have expanded feet and somewhat broadened tails, but much of their life still is spent on land. Sea Otters, very furry, are more maritime in habit and rest merely on the rocks and breed there. They are remarkable for the purple hue of their bones. That purple is derived from the sea urchins which they eat in such abundance, sea urchins which the Otters crack upon their chests with stones as they float on their backs at the surface having risen from their food-seeking dives to the bottom. The seals, about thirty species of them, are more aquatic still, usually insulated with thick layers of blubber though yet retaining hair; their limbs have become flippers; and their external ears are gone or nearly so. Though some, like the Weddell Seal, may spend months swimming and feeding in utter darkness beneath the ice of the antarctic littoral, all still must pup on land or on the ice, and suckle 'terrestrially'. On the other hand the Cetaceans-near a hundred species of dolphins, porpoises and whales-are still more aquatically adapted. The whole life is lived in water, birth and suckling included. They have many remarkable detailed anatomical and physiological adaptations to their free pelagic life, many of them for ever roaming the open oceans. The hind limbs have vanished completely and propulsion is entirely by the hugely expanded horizontal tail: the blubber is thick and all hair has gone.

If you like so to speak or so to regard them, the Sirenians, our mermaids, lie midway in aquatic adaptation between the seals and the whales. The Sirenians have almost completely lost their hair but the blubber layer is relatively thin in those which live in tropic waters. They have also lost their hind limbs and the tail is broad and strongly propulsive. They breed, calve and suckle in the water and are incapable of

emergence on to land. But still they sometimes have interest in the land, and can heave themselves up enough to put the forward part of the body on to the river bank and there eat chosen succulent vegetation. These Sirenians are riverine, estuarine and coastal living animals, not creatures of the open seas. In such marked distinction to the wholly carnivorous

seals and whales, the Seacows are totally vegetarian, and their teeth show remarkable modifications and adaptations in relation to that fact.
A curious feature of manatees, indeed of dugongs too, is their mode of tooth replacement. Most of us mammals, men and maidens alike, proceed in youth with so-called milk teeth, which later are shed by the growth of the adult teeth, one permanent tooth replacing each milk tooth by growth beneath its roots. That we may call the normal mammalian arrangement. This natural process, for a variety of dietary reasons, is often inadequate in ourselves, and must be supplemented by the provision of dead porcelain artifacts attached to plastic plates. Not so the manatees and dugongs-and in this they parallel their closest zoological congeners, the elephants-the manatees and dugongs replace their teeth by a forward longitudinal movement in the jaws. The permanent teeth, with us the so-called second set, are limited to molars, that is to say grinding teeth. No incisors or canines are present in these creatures save upper second incisors in some dugongs, teeth which parallel those second incisors of elephants which, from their large size, we call tusks. The molars form, in each half jaw, a set of six to eight grinders functional in a row contemporaneously in manatees, while in dugongs it is usually only four, and in elephants fewer still. The forward teeth in each row, it will be seen on close examination, are worn relatively smooth while those behind are ridged and sharp, in fact are actually and functionally younger. Throughout these

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creatures' chewing adult life the teeth are worn by attrition, and as they wear the whole set moves forward. The older teeth successively reach the front position in the jaw and then are lost, while others successively emerge behind, new and strongly ridged, and in their turn suffer attrition and forward motion. So may a score or more of teeth move forward in succession along each side, both above and below. That is the number in manatees; in dugongs it is a good deal less; and in elephants again fewer still. That is the way in which the demands of constant wear are met, by the provision of more teeth in series from behind rather than, as in rodents, ruminants, and others, by perpetual growth of the individual tooth within its own stable socket. The peak of aggrandize-

ment in that line of course is the narwhal tusk, which can achieve a length of even ten feet or more.

In contrast, Steller's Seacow had lost all its teeth in adult life and crushed the food solely by means of horny plates which presumably regrew as fast as worn away. The extent of wear of the teeth of Sirenians is perhaps surprising considering the softness of the vegetation upon which they feed. Probably the rapid wear derives from sand grains admixed with the enormous volumes of weed consumed.

There are other interesting features observable in the bones and skeletons of Sirenians. Particularly is there a regular hardening and increase of density of certain of the bones (termed pachyostosis), to produce almost the appearance of ivory. This phenomenon occurs least in dugongs and most in Steller's Seacows. It may be useful in increasing the density of the whole body, a convenience perhaps for their special mode of life. The same phenomenon is found in fossil Sirenia, while in most modern animals, including ourselves, it is counted as a rare disease called hyperostosis.

Though the total number of vertebrae in mammals may be

quite varied according to the species, there is a general insistence-so it seems-that in the neck there shall always be just seven cervical vertebrae. The exceptions to this rule are rare and among them are the Sirenians, where the cervical vertebrae regularly are six in number. The other exceptional animals are the sloths of South America where, if you take the number of toes in the name and multiply by three, you will find the number of neck vertebrae. The two-toed sloth, Choloepus didactylus, has six cervicals and the three-toed sloth, Bradypus tridactylus, has nine (or even ten).

The fossil record shows that the Seacows are not so very ancient in their evolution, the oldest known to us being Eosiren from the Upper Eocene of Egypt, a period of the order of fifty million years ago. Fossil Sirenians are not rare and are widely scattered over the world. Especially are there remains of Sirenians much resembling the modern dugong-remains found in Egypt, Europe (Italy, Austria, Germany, France, Belgium and England), the West Indies and California. At an earlier stage these dugongs must have inhabited most warm coasts of all the continents, whereas now they are confined to the Indo-Pacific region. The direct progenitors of the modern manatees are however as yet unknown. Even their modern Atlantic habitat has so far produced no more than fossil dugongs which in fact today are quite absent from that region.

We may summarise the modern mermaids thus: in recent times there have been three genera of Sirenians, namely the recently extinct Steller's Seacow of Bering Sea; the Indo-Pacific dugong (sometimes called Halicore); and the three species of manatee[1] in the Atlantic region. By a little to extend

the detail we arrive at this arrangement:
1 Lamantin in French; Peixe-Boi (fish-ox) in Brazilian; Seekuh (seacow) in German.

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A. DUGONGIDAE. (Dugongs)
-Dugong dugon (Australia). Red Sea, coasts of East Africa, islands of Indian Ocean, Ceylon, Malayan Archipelago, Philippines and northern Australia.
B. TRICHECHIDAE. (Manatees)
-Trichechus senegalensis. West African rivers and coastal lagoons from Senegal to Angola.
-Trichechus inunguis. Amazon and Orinoco rivers.
-Trichechus manatus
Two sub-species
-Trichechus m. manatus. West Indies, coasts of Yucatan, Southern Mexico, Central America, and northern South America to the Guianas.
-Trichechus m. latisrostris. Florida peninsula.
C. HYDRODAMALIDAE. (Steller's Seacow)
-Hydrodamalis (Rhytina) Stelleri. Bering and Copper Islands in Bering Sea.
Now first consider Steller's Seacow. It was a most remarkable animal and all the more sad that it was so soon exterminated by hungry seamen after its discovery by Russians in 1741. The animal grew up to a length of even thirty feet, was slow moving, and not afraid of its new and ruthless predator. It was the largest herbivorous aquatic mammal there has ever been-so far as we know. It lived exclusively on marine algae, and its mouth was armoured with no more than horny plates with which it chumped the seaweed sufficiently for swallowing. Of its detailed life history and habits our chief knowledge is derived from the care and skill of the earliest observations. And that is a tribute to Georg Wilhelm Steller. This German naturalist was the ship's doctor with the Danish Cominodore

Vitus Bering when his Russian expedition' was exploring the Bering Sea-so suitably named after him. In 1741 the expedition was wrecked and forced to winter at the newly-found islands named after Bering's title. Steller must have been a remarkable man to have persisted so diligently with his detailed observations despite scurvy and shipwreck in this climatically most inhospitable situation. Steller's Seacow and Steller's Eider and Steller's Sea Lion are his memorials: though the Seacow now has gone, both Steller's Eider and his Sea Lion remain to grace the region.
At this period there were many Russian exploratory voyages in the far north Pacific Ocean. Bering and Pribilof

were two expedition commanders whose names remain upon the modern map, and with them and their newly-discovered islands are associated the discovery of the breeding congregations of the Seacows and the Fur Seals. The Russian geographical discoveries were soon followed by organized hunting expeditions and then by missionaries of the Russian Orthodox church. These last worked among the Aleuts of the island chain and the Indians of mainland Alaska. Despite the sale of Alaska to the United States, for seven million dollars in 1876, and all that has happened since, still the onion-domed Russian Orthodox churches may be seen in the region and indeed much further south along the American Pacific seaboard.

Steller's Seacow perhaps never was very numerous-perhaps no more than a total of 2,000 individuals at the time of their discovery. It thus resembled the extinct Dodo, that huge ground-pigeon of Mauritius, rather than the myriads of the more recently extinguished Passenger Pigeon of the United States, and the similarly now lost Great Auk of both sides of the

1 A convenient summary is available in 'Bering's Last Voyage' by Frank Debenham. Polar Record, Vol. 3, No. 22, July 1941.

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North Atlantic Ocean. The Seacow lived its quiet life in Bering Sea, north of the Aleutian chain of islands, south of Bering Strait itself and centred on the Commodore Islands-Bering Island and Copper Island. There, Seacows were the aquatic vegetarian equivalents of the millions of Alaskan Fur Seals of the Pribilof Islands, feeding on fish and squids, and the numerous Sea Otters feeding largely on sea urchins and other bottom fauna. Such islands are girt about with immense tangled masses of brown algae-seaweeds bigger than our own European Laminaria but not competing in size with the enormous Macrocystis of the Southern Ocean which may extend for over three hundred feet in length. Those enormous brown algae may indeed achieve a length exceeding the height of the very tallest trees, the redwoods, the Douglas fir and certain eucalypts. The tangled heaving masses of algae are on the whole avoided by the Fur Seals who speed for food to greater distances from land, and in the non-breeding season spread on migration over the whole of the north Pacific Ocean. Those same masses of brown seaweed are the happy hunting ground of the Sea Otters who sought their food among and below them. On the other hand the Seacows ate, it seems, smaller species of green and brown algae in shallow water, and throve on them until man, the overwhelming hunter, came and slaughtered and extinguished the species for ever.

Oddly enough on a calm day and from an eminence, those huge beds of brownish seaweed in the Bering Sea, with their

shining trailing ends awash at the surface yet disturbed by passing winds, bear an unexpected resemblance to fields of corn at home in England-when breezes ripple across the purpling awns of the barley fields in June. The barley must be reaped and threshed and brewed to beer or fed to our domestic stock. The Seacows browsed direct on the algal fields, contentedly we may imagine, well insulated by blubber

from the chill waters and heedless of the fog which is the almost year-long attribute in chief of the centre of the Bering Sea.

Today, it must be true to say, there are no considerable aggregations of large mammals anywhere on earth which have not yet suffered a deliberate hunting effort. The only possible exceptions to that statement may be species of pelagic porpoises out in the open oceans, still preserved by their own swiftness and the difficulty of prognostication of their whereabouts. Steller's Seacows, so large, so unfearful of man, so densely congregated, were quickly exterminated. The usual estimate is twenty-seven years from discovery by predatory man.

Stejneger, Steller's biographer, referring to the period 1743 to 1763, said 'hardly a winter passed without one or more parties spending eight or nine months in hunting fur-animals there' (Bering Island) 'during which time the crews lived almost exclusively on the meat of the sea-cows. But that is not all, for more than half of the expeditions which wintered there did so for the express purpose of laying in stores of sea-cow meat for their further journey, which usually lasted two to three years more. . . . . From 1768 the visits to Bering Island seem to grow scarcer... probably due to the very fact that sea-cows had now become so nearly exterminated that the few left were insufficient to maintain any wintering and foraging expedition'. Possibly a few survived into the following century.

According to Kuntze (1982), the Russian naturalist Dybowski in 1879-85 collected reports and skeletal remains

1 Quoted by Glover M. Allen in his 'Extinct and Vanishing Mammals of the Western Hemisphere', 1942. Special Publication No. 11 of the American Committee for International Wild Life Protection.

2 See Glover M. Allen, ibid.

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at Bering Island; he was told by the natives there that 'the great sea-cow still survived at the time of the arrival of the permanent settlers', which would extend the period of its existence to about 1880.[1] He mentions also, as a contributory

factor to its extinction, the formation of ice along the coast from time to time, thus restricting still further its available territory.

Steller's Seacows were altogether too easy to catch. Apparently they lived in herds and fed in shallow water, coming in with the tide into areas of growing littoral algae. There they pressed so far into the shallows that often the backs of the animals were exposed and gulls perched upon them and fed on the crustacean parasites and other fauna of their rugose skins. The skin was in fact of a remarkable form, remarkable in thickness, anatomical detail and rugosity. Pieces are still available in some museums. Comparison in the early days was made with the bark of a tree, and the animal was sometimes referred to in German as 'Borkentier'-the bark animal. In free translation a passage by Steller[2] may be rendered thus in description of the surface parasites. 'The Seacow is constantly assailed by a particular crustacean like a louse. These are wont to occupy, in great numbers, usually the breasts, the nipples, the sexual orifice, the rump, and to

1 Flower and Lydekker 1891 in a footnote on p. 221 of their book Mammals Living and Extinct say that Nordenskiöld, during his voyage in the Vega, obtained some information from the natives of Bering Island which led him to believe that a few individuals may have survived to a much later date, even to 1854; but this conclusion is disputed by later writers.

2 All quotations from Steller in this chapter are translations from a short modern and convenient German work by Dr Erna Mohr entitled Sirenen oder Seekühe, published in 1957 (Die neue Brehm-Bücherei. A. Ziemsen Verlag. Wittenberg Lutherstadt). The author is indebted to the British Museum (Natural History) for the loan of a translation by Cmdr. J. M. Chaplin, R.N. (ret'd).

inhabit the hard pits in the cuticle. Since the crustaceans eat through the cuticle and skin there are formed warts here and there from the exuded tissues below. These attract seagulls which sit on the animals' backs and seek with their sharp beaks this agreeable food and thus render a friendly and pleasant service to the tormented animals.' The crustaceans are in fact Cyamus rhytina, an Amphipod, which shares the host with certain barnacles.

The extreme thickness and rugosity of the hide was presumably an adaptation to the dangers of mechanical abrasion by ice floes under the influence of heavy surf in the shallow waters where the animals fed.

Killing beasts so large, so docile and so palatable was all too easy. The unfortunate creatures were, it seems, simply impaled upon great hooks by men coming among them in boats in the shallow water. Then they were dragged ashore by ropes, struggling and groaning and spouting blood from their many wounds. Struggling still they were lanced, speared and cut about with knives until at last their lives departed. Sometimes

it seems that when a female was killed the attendant male, or several males, would even further increase their own danger by following her unto the water's edge, and then remaining even in the vicinity of the carcase on the beach. This same occurrence has been noted too in accounts of hunting the manatees of the Amazon in Brazil. There, too, if a female first could be hooked or roped the males would assemble and hazard themselves-nobly, unwittingly, automatically as you may like to interpret■to the gratification of the hunters and the depletion of the stock.

To get the harpooned animals to the shore a rope party of thirty was required, so Steller tells us, who 'held the beast and, against a fearful resistance by it, dragged it ashore by a great effort. Those however who were in the boat made themselves

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fast to another rope and exhausted the animal with constant blows and strokes so much that finally it became motionless and tired and they killed it with pikes, knives and other weapons and pulled it ashore. Some cut quite big pieces out of the still living animal. All that the animal did meanwhile was to thrash about mightily with its tail and so resisted with its forearms that frequently large pieces of the outer skin burst off. In addition it took very heavy breaths groaning therewith.. From the wounded back the blood spurted like a fountain. As long as its head remained below water no blood flowed. As soon however as it lifted its head clear and drew breath the blood shot out again. . . .'

...

Steller went on to remark: 'Old and very large beasts are more easily taken than the calves because the calves move much more powerfully and when the skin is burst they tear themselves free. If the beast, after being caught with the hook, begins to move more violently then not only the adjacent ones of the herd moved and are provoked to come to the aid of the captive. Some seek to capsize the boat with their backs, others lie upon the rope and endeavour to break it or try by beating with the tail to get the hook out of the wounded animal's back which at times they have tried with good results. A very remarkable proof of their love for kin and mate is that the male shoots like an arrow quite without hope after the female who is already dead, having tried with all his might but vainly to free her from the hook that is dragging her, and having thus received many blows from us nevertheless followed her to the beach. When next day early we returned to cut up the meat and take it home we found the male again with his female and even on the third day I have seen him when I went along alone to examine the intestines.

'These beasts like shallow and sandy places on the sea shore

but above all they love to dwell at the mouths of small rivers to

which the sweetness of the debouching water entices them at all times in crowds. The young animals and pups, when they go to their pasture, are allowed to precede them but they hem them in from behind and at the sides very carefully and always keep them in the middle of the herd. With the flood tide they approach so near to the beach that I was able to reach them not only with a stick or lance but have also stroked their backs with my hands at times. If they are rather badly injured they do nothing except to retreat further from the shore but after a short while they forget about it and return. Commonly whole families live together, the male with the female a grown-up and a quite young animal. Seemingly they pair off. They give birth at all seasons but usually in autumn as I assumed by the pups born at that time. As however they mostly mate at the beginning of spring I concluded that their period of gestation is over a year. That they produce only one pup is concluded from the shortness of the teats and the number of the breasts. I have also never seen more than one calf round its mother'.
'These voracious animals feed without pause and from great greed keep their heads continually underwater without bothering about their lives or safety. So a man in a boat quite naked can go right amongst them and choose one of the herd with assurance and throw his hook. Their entire toil whilst feeding is that every four or five minutes they poke their noses out of the water and blow out air, as well as a little water, with a noise similar to the snorting of a horse. During feeding they move one foot after the other slowly forward so that they are partly swimming slowly and partly pacing along as cattle and sheep do when grazing. Half the body, namely the back and sides, are at all times raised out of the water. Whilst they are eating the gulls alight upon their backs and feed on the lice infesting the skin; just as the crows with the lice of pigs and sheep. They do not however eat all brown algae

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indiscriminately.... Wherever they have stayed for a day immense heaps of roots and stems are cast on the beach by the waves. When their bellies are filled some sleep lying on their backs. They retreat from the beach so that they shall not be left lying high and dry when the tide goes out. In winter they are frequently suffocated by ice which floats into the shore and are cast upon the shore dead; which also happens if they get into the surf, which beats upon the rocks with violence, and are thereby also flung against the rocks. In winter they are so thin that one can see their backbone as well as all their ribs. In the spring they mate like human beings and especially towards the

evening, if the sea is calm. Before they come together many love-games take place. The female swims slowly to and fro the male following. He deceives the female by many twists and turns and devious courses until finally she herself becomes bored and gets tired and forced to lie on her back, whereupon the male comes raging towards her to satisfy his ardour and both embrace each other'.

'As regards the voice, the animal is dumb, and does not utter a sound; it breathes very heavily and sighs and groans only when it has been wounded. Whether it has good eyes and ears I cannot say'.

dense,

'The fat which surrounds the whole body is

shiny, white and when laid in the sun yellow as spring butter. It smells and tastes very pleasantly and... even to be preferred to the fat of the quadrupeds by far. For not only can it be kept in the hottest weather for very long but also does not become rancid or smelly. When it is cooked it tastes very sweet and good so that it took away all our appetites for butter. In taste it almost approaches that of the oil of sweet almonds and can be used... just like butter. In a lamp it burns brightly without smoke or smell. Perhaps it will not be without use in medicines, because it is a mild laxative and if drunk in considerable

quantity at once, does not cause any disgust and does not spoil the appetite. Perhaps it will be more useful to those suffering from the pains of stone than the mastication of bones or so-called manatu stones. The tail fat is denser and harder and when cooked better tasting. The flesh has to a certain extent stronger and thicker fibres than beef. It is redder than that of land animals'.

"The meat is, when cooked, even though it takes rather long to cook, of very good taste and not easily distinguished from beef. The fat of the calves is so similar to fresh pork fat that it can hardly be distinguished from it. The flesh is however just like veal. It can be easily cooked to tenderness and swells during cooking so that it takes up twice as much room in the pot as before.

The intestines, the heart, the liver, the

kidneys are much too tough and we did not hanker after them as we had meat in abundance.'

All those paragraphs are from Steller's original description and very lucid they are. Steller's biographer was the zoologist Stejneger who pointed out, in 1887[1] 'there can hardly be any. doubt that these animals were the last survivors of a once more numerous and more widely distributed species, which had been spared to that late date because man had not yet reached their last resort. It is, then, pretty safe to assume that this colony was not on the increase and that, under the most favourable circumstances, the number of surviving young ones barely balanced the number of deaths caused by the dangers of

the long winters. Under this supposition, every animal killed by a new agency-in this case by man-represents one less in the total number'. Slow and stationary in habit, unsuspicious, and without means of defence or escape, its disappearance,

1 See 'How the Great Northern Sea-Cow (Rytina) was Exterminated' by Leonhard Stejneger. The American Naturalist, December 1887, Vol. XXI, No. 12.

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Stejneger asserts, 'was simply due to man's greed'. Brandt (1846) in his monograph writes: 'Stupiditas animalis summa fuit.'

Steller's Seacows were the only Sirenians available in large and all too easily visible aggregations, and they suffered accordingly: the hunting was far too simple for the species' good. So they were soon extinguished for ever. The dugongs and the manatees, certainly it seems, are somewhat gregarious, but the modern depletion of their numbers gives us now no chance to observe the original extent of the aggregations. It is probable however that such aggregations, as did exist, were rarely comparable in size with those of Steller's Seacows. But there is one record, at least, of an enormous herd of dugongs yet without true indication of the actual number. Glover Allen may be quoted. He writes: 'In his excellent account of the dugong, Troughton (1928, 1982) says that in 1893 large herds were a common sight in Moreton Bay, Brisbane, and that fishing or netting was carried out there and at Hervey Bay, but the slow breeding of the animals has usually put a stop to ungoverned slaughter. They are not so plentiful now between Brisbane and Cairns, eastern Queensland, and range round the north coast of Australia to Broome on the west coast. In July, 1893, a herd in Moreton Bay was reported as extending over a length of about three miles with a width of 300 yards.'

The secretive, surreptitious, private way of life of these lesser and surviving Seacows must always have made accurate observation difficult. That habit has doubtless been their saving grace, their protective and most fortunate reaction. It has saved them until this day but the danger presses all about them for men are terribly ingenious in their modes of hunting.

Men set nets on the bottom to entangle the dugongs, or

they fasten loops with pegs to the bottom to noose and drown the manatees in the rivers. Men can come silently in dugout canoes, waiting and watching, then use spear and lance, with attached ropes and bladders and wooden floats. Men can wound the nostril valves with shot knowing that then the

desperate creatures must surface repeatedly or drown. Men can learn that, in the Amazon, manatees may lurk in groups beneath drifting islands of floating vegetation, breathing through gaps in the centre. There the hunter may station himself with devastating effect upon those which lurk unsuspecting below but must needs rise for air at intervals. Men may take the female resting after copulation, even use her■ then in season-to attract males to their death as well.
In contrast with Steller's Seacow and its extremely restricted distribution in the cold Bering Sea, the dugong is today still widely spread in the warm waters of the western Pacific and Indian Oceans. Its modern range extends from Queensland and northern Australia to the Philippine Islands, from the Malay Archipelago to the islands of the Bay of Bengal and Ceylon, and from the east coast of Africa to Arabia and the Red Sea.
Compared with the three existing species of the manatee, and fairly acceptable subspecies as well, the dugong is in general now regarded as all belonging to a single widespread species. The dugong grows in fact to a length of about ten feet but the measurements available are few. Compared with the manatee with its rounded, rather shovel-like tail, the dugong's tail is broadly notched in the middle line and has pointed lateral lobes, though in that last respect not to the extent in Steller's Seacow whose tail was approximating to the shape in many whales. Otherwise the dugong and the manatee outwardly are not so very different from one another to the non-zoological observer. However the dugong is in general

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In search of Mermaids by George Lowdes Bertram Thomas Crowell Vo.N.Y. co. 1963 Chapter 3* The sea cows of the world, Their world wide fate

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